MWP

Chapter 07 Water

An Rínn Rua Hotel and Leisure Park
County Kerry

Rínn Rua Holiday Park LTD

April 2024

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7. Water

7.1 Introduction

This chapter considers the potential effects on the existing water environment arising from the Proposed Development. A full description of the Proposed Development, development lands and all associated project elements is provided in Chapter 02 Project Description of this EIAR. The nature and probability of effects on the existing water environment arising from the overall project has been assessed. The assessment comprises:

- A review of the existing receiving environment.
- Prediction and characterisation of likely effects;
- Evaluation of significance of effects; and
- Consideration of mitigation measures, where appropriate.

7.1.1 Competency of Assessor

The assessment was completed by Roman Puotkalis (BSc (Hons), MSc), an Environmental Consultant with MWP. He holds an MSc in Environmental Analytical Chemistry and BSc (Hons) Environmental Science from University College Cork. Roman has been involved in geo-environmental investigation/interpretation and hydrogeological assessment and investigation. Roman has written Water chapters for various projects such as wind farms, grid routes and power generating stations which has included assessment of environmental impact on Surface water and Hydrogeology as well as cumulative impacts with various other aspects of the environment. He has also worked on Phase 1 and 2 environmental site assessments for several projects including pharmaceutical facilities, substations, mines, and power stations.

7.1.2 Legislation

The following section sets out the legislative context of the assessment in relation to surface and groundwater quality.

7.1.2.1 Water Framework Directive (WFD) (2000/60/EC)

The Water Framework Directive (WFD) (2000/60/EC) establishes an integrated and coordinated framework for the sustainable management of water. Under the WFD1, the island of Ireland has been divided into a number of River Basin Districts (RBD) in order to facilitate the effective implementation of the WFD objectives. The proposed development site is located within the Irish River Basin District (IRBD) in Hydrometric Area No. 21.

The strategies and objectives of the WFD in Ireland have influenced a range of national legislation and regulations, since its inception in the year 2000.

The WFD (1st Cycle) was transposed into national legislation in 2003, with the aims to:

- Prevent deterioration of status for surface and groundwaters and the protection, enhancement and restoration of all water bodies;

[1] Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy.

- Achieve good ecological status and good chemical status for surface waters and good chemical and good quantitative status for groundwaters;
- Progressively reduce pollution of priority substances and phase-out of priority hazardous substances in surface waters and prevention and limitation of input of pollutants in groundwaters;
- Reverse any significant, upward trend of pollutants in groundwaters; and
- Achieve standards and objectives set for protected areas in Community legislation.

The objective for each surface water and groundwater body is to prevent deterioration, maintain high and good status waters, restore waters to at least good status where necessary, and ensure that the requirements of associated protected areas are met.

The River Basin Management Plan for Ireland 2022 - 2027 (RBMP), the third-cycle of river basin management planning under the WFD, provides for the targeted implementation of the two principle objectives of the WFD, namely;

1. To prevent the deterioration of water bodies and to protect, enhance and restore them with the aim of achieving at least good status; and
2. To achieve compliance with the requirements for designated protected areas.

Five key 'evidence-based' priorities form the pillar of this iteration of the RBMP are outlined as follows:

1. Ensure full compliance with relevant EU legislation;
2. Prevent deterioration;
3. Meet the objectives for designated protected areas;
4. Protect high-status waters; and
5. Implement targeted actions and pilot schemes in focused sub-catchments aimed at:
    a) targeting water bodies close to meeting their objective; and
    b) addressing more complex issues that will build knowledge for the third cycle.

The assessment will determine the impact in accordance with the following regulations which give effect to the WFD:

- S.I. No. 9 of 2010 European Communities Environmental Objectives (Groundwater) Regulations 2010 (as amended);
- S.I. No. 272 of 2009 European Communities Environmental Objectives (Surface Water Regulations) 2009 (as amended);
- S.I. No. 296 of 2009 European Communities Environmental Objectives (Pearl Mussel Regulations) 2009 (as amended); and
- Urban Waste Water Treatment Regulations (SI No. 254 of 2001 as amended) (UWW Regulations).

These Regulations have been devised to implement the requirements of the WFD and establish Environmental Quality Standards (EQS) for the purpose of assessing the status of surface waters and groundwaters. The Surface Waters Regulations apply to all surface waters including lakes, rivers, canals, transitional waters, and coastal waters and supersede all previous water quality regulations.

7.1.2.2 Water Framework Directive - Protected Areas

The WFD requires a register of protected areas. These are protected for their use (such as fisheries or drinking water) or because they have important habitat and/or species that directly depend on water. The register includes areas identified by the WFD itself or other European Directives. These may include the following:

- Areas used for water abstraction - European Union (Water Policy) (Abstractions Registration) Regulations 2018 (S.I. No. 261 of 2018);
- Areas designated for the protection of economically significant aquatic species (Freshwater Fish Directive 78/659/EEC; Shellfish Directive 79/923/EEC);
- Recreational waters (Bathing Waters Directive 76/160/EEC);
- Nutrient Sensitive Areas (Nitrates Directive 91/676/EEC; Wastewater Treatment Directive 91/271/EEC);
- Areas of protected species or habitats where water quality is an important factor in their protection (Natura 2000 sites under Birds Directive 79/409/EEC and Habitats Directive 72/43/EEC); and
- Surface waters (The European Communities Environmental Objectives (Surface Waters) Regulations [S.I. No 272 of 2009], and amendment regulations 2012 [S.I. 327 of 2012]).

Ballinskelligs Bay and Inny Estuary Special Area of Conservation (SAC) is located directly south and east of the proposed development site. Killarney National Park, Macgillycuddy's Reeks and Caragh River Catchment SAC is located 5.0 km east of the proposed development site.

Iveragh Peninsula Special Protection Area (SPA) is located approximately 3.6 km to the southwest of the proposed development site. Potential impacts of the proposed development on the SACs and SPAs are addressed in **Chapter 05 Biodiversity** and in the **Appropriate Assessment (AA) Screening Report** submitted with the planning application package.

7.2 Methodology

The assessment methodology included desk-based studies, and a qualitative assessment of the potential impacts. The following methodology has been used in the assessment of impacts:

- Identifying baseline conditions of the site and its environs;
- Identifying the sensitivity of receptors that had potential to be affected by changes in the baseline conditions;
- Predicting the magnitude of likely changes to the baseline receiving environment;
- Assessing the significance of effects taking into account the sensitivity of receptors and the magnitude of the effect;
- Identifying and assessing appropriate mitigation measures, including alternatives; and
- Assessing the significance of residual effects, taking account of any mitigation measures.

7.2.1 Relevant Guidance and legislation

Relevant guidelines and legislation have been used to inform the preparation and assessment of impacts from the proposed development on surface water and groundwater, including:

- Environmental Impact Assessment (EIA) Directive 2014/52/EU, as amended;

- The Commission notice regarding application of the Environmental Impact Assessment Directive (Directive 2011/92/EU of the European Parliament and of the Council, as amended by Directive 2014/52/EU) to changes and extension of projects - Annex I.24 and Annex II.13(a), including main concepts and principles related to these;
- National Roads Authority (NRA) (2009) Guidelines on Procedures for Assessment and Treatment of Geology, Hydrology and Hydrogeology for National Road Schemes and EPA Guidelines – Advice Notes on Current Practice (in the preparation of Environment Impact Statement);
- Department of Housing, Planning and Local Government (DHPLG) (2018) Guidelines for Planning Authorities and An Bord Pleanála on carrying out Environmental Impact Assessment;
- EPA (2022) Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EIAR); and
- Institute of Geologists of Ireland (IGI) (2013) Guidelines for the Preparation of Soils, Geology and Hydrogeology Chapters of Environmental Impact Statements.

Relevant water quality standards have been consulted and used to inform the assessment where relevant, including:

- European Communities (Drinking Water) Regulations 2014 (S.I. No. 350 of 2014);
- European Communities Environmental Objectives (Groundwater) Regulations 2010 (S.I. No. 9 of 2010), as amended in S.I. No. 389 of 2011, S.I. No. 149 of 2012 and S.I. No. 366 of 2016 and;
- European Communities Environmental Objectives (Surface Waters) Regulations 2009 (S.I. No. 272 of 2009) as amended by S.I. No. 327 of 2012, SI No. 386 of 2015 and S.I. No. 77 of 2019.

7.2.2 Desktop Study

The methodology used for this study included desk-based research of published information to assemble information on the local receiving environment. The desk study included the following activities:

- Review of Ordnance Survey Ireland (OSI) Mapping and aerial photography to establish existing land use and settlement patterns within the study area.
- Review of local and regional development plans and planning policy in order to identify future development and identify any planning allocations within the study area, for example Draft Kerry County Development Plan (CDP) 2022-2028.
- Review of Kerry County Council's (KCC) Planning Register to identify relevant development proposals currently under consideration by the Council.

7.2.3 Assessment Criteria

The method of impact assessment and prediction follows the EPA (2022) *Guidelines on the information to be contained in Environmental Impact Assessment Reports (EIAR).* The methodology and approach outlined in the EPA Guidelines was used to determine whether the proposed development had the potential to cause significant effects on the hydrological or hydrogeological environment. The recommendations outlined in the EPA Guidelines are outlined in Chapter 01 Introduction of this EIAR.

7.3 Existing Environment

7.3.1 Site Location and Description

Rínn Rua Holiday Park LTD ('the Applicant') is seeking planning permission for the development of a holiday village with a footprint of 47ha. The proposed development will occupy approximately 22.6ha of the 55.85ha of land owned by the Applicant. The proposed development site is located at the derelict Waterville Beach Hotel at Rínn Rua/Reenroe, Waterville, Co. Kerry on the Iveragh Peninsula between the coastal villages of Waterville and Ballinskelligs as shown in **Figure 7-1**. The proposed development site is located on a small headland on the northern shore of Ballinskelligs Bay, Co. Kerry, just under 1.0km from the R567 Waterville to Ballinskelligs Coast Road. To the west and east of the headland are the sandy/stony beaches of Ballinskelligs Bay and to the south is the Bay.

The proposal will involve restoration of the existing derelict hotel and expansion of the visitor offering to include holiday lodges, mobile homes, touring caravan pitches, and glamping pods along with sensitive landscaping of the entire development area. The development proposal will also include visitor services including a shop, bar, restaurant, reception area, Leisure Centre, and measures to enhance local amenity including improvements to Reenroe beach access and parking. A habitat enhancement area is also proposed on the lands to the east of the site boundary which are also in the ownership of the applicant.

The proposed development site within the redline boundary (refer to **Figure 7-2**) comprises approximately 22.6 ha and encompasses:

- a large derelict hotel and two storey house;
- the access road to Reenroe beach;
- the Reenroe Cliff Walk; and
- agricultural land.

A detailed description of the proposed site location and description of the proposed development is provided in **Chapter 02 Project Description** of this EIAR.

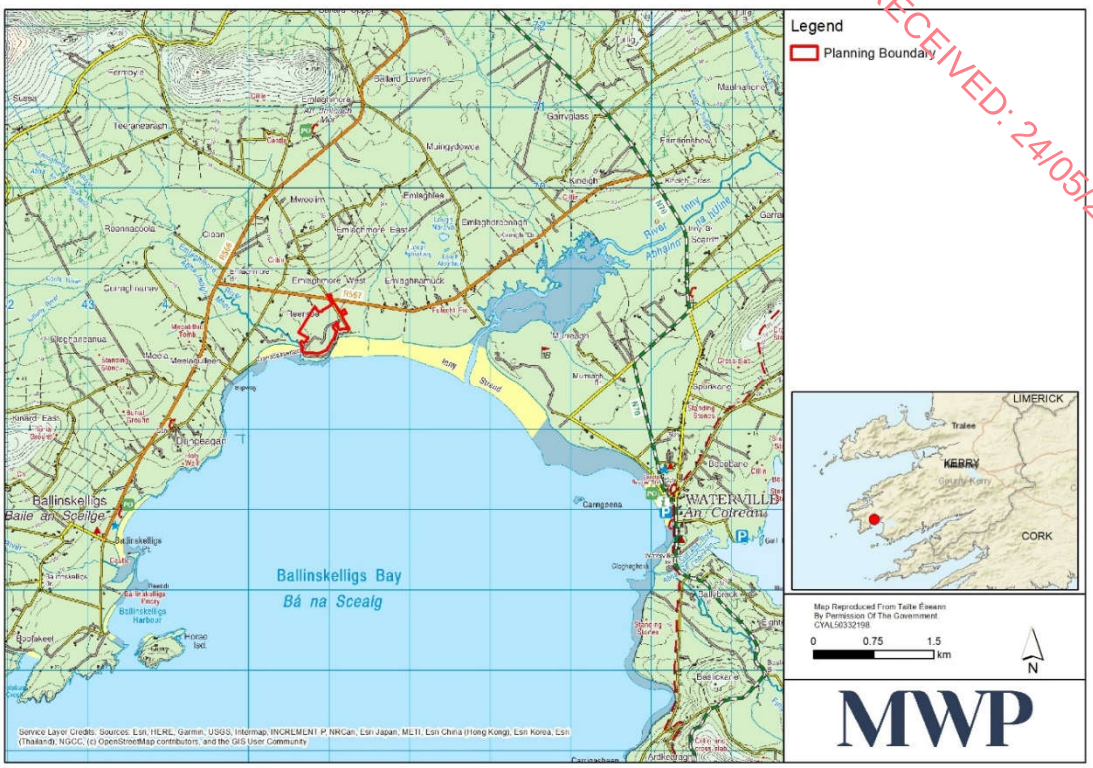

Figure 7-1: Site Location (County Scale)

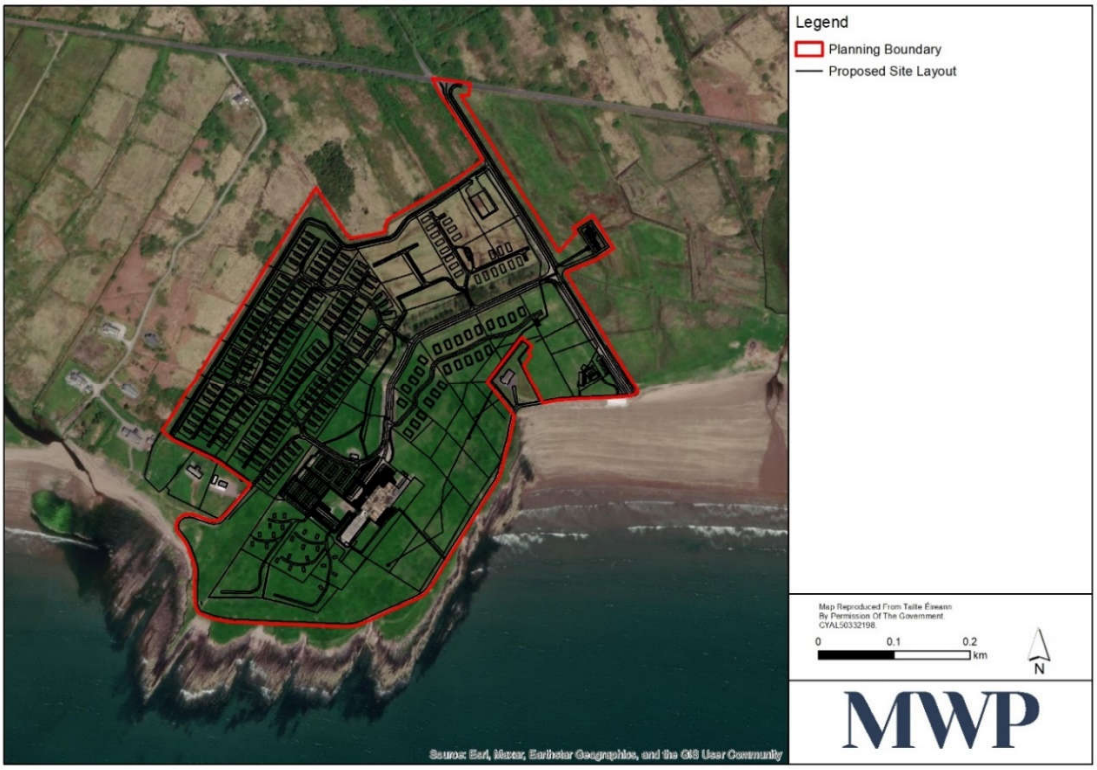

Figure 7-2: Site Layout

The **Civils Report** submitted as part of the planning application describes the proposed drainage systems for the proposed development. A summary is also provided in **Sections 2.4.8** and **2.4.9** in **Chapter 02 Project Description** of this **EIAR**. The following sections are taken from the report and outline the proposed drainage systems for the development.

A summary of the operational wastewater and storm water arrangements are provided below.

7.3.1.1 Waste Water Drainage

The waste water will be treated at a new on-site tertiary waste-water treatment plant to be built by the developer. The WWTP will be constructed to the east of the beach access road (see **Figure 2-7**). It will be a sequential batch reactor (SRB) wastewater treatment facility which treats water in a cycle of four stages namely: Fill, React, Settle and Discharge. Generally, this cycle is repeated 3 times a day, but this can vary 6, 8, 12 or 24 hours to handle varying wastewater and hydraulic conditions. The system includes a UV- treatment unit.

The expected maximum foul discharge from this facility is 144 400 litres per day. The level of treatment will be to a minimum of 3:10 BOD:TSS with 99.9% removal of faecal coliforms, with pathogenic bacteria absent. See **Table 7-1** below for design effluent concentrations from the proposed WWTP.

Table 7-1: Design Effluent Concentrations from proposed Tertiary Treatment System

Parameter	Concentration (mg/l)	Unit
BOD_5 (Biochemical Oxygen Demand)	3	mg/l
TSS (Total Suspended Solids)	10	mg/l
Ammonium-Nitrogen	2	mg/l
Nitrate-Nitrogen	10	mg/l
PO_4P (Phosphate)	1	mg/l

The treated water from the WWTP will be discharged to the constructed underground percolation areas filled with coconut fibres located below the lawns on the seaside of the hotel and lodges within the main development area (see **Drawing 21513 MWP 00 00 DR C 2111** in the planning pack). The use of the percolation areas for discharging to ground results in a natural down gradient of contaminants and the movement of treated effluent through the ground results in a final estimated discharged BOD_5 concentrations down to 0.5 mg/l. The use of the percolation areas and filtration by the soil will also attenuate the Orthophosphate concentration by 90% to 0.061mg/l prior to mixing with groundwater. The nitrates also undergo an attenuation when passing through the biomat to an order of 10% reduction (Gill et al 2009). Utilising a background level of 1mg/, the estimated concentration of Nitrates will be 5.52mg/l which is under the threshold level of 8.47 mg N/l for ground water discharge. There is a similar attenuation of Ammoniacal Nitrogen of 10% when discharged through subsoil. Assuming a background level of 0.05 mg NH_4/l in the soil, the reduced calculated level is 1.1 mg NH_4/l which is above the threshold of 0.175 mg NH_4/l of the Groundwater Regulations but there are no drinking water abstractions downgradient of the site.

The assessment of further surface water assimilative capacity (see **Section 3.4.2** of the **Civils Report**) indicates that the predicted BOD at the surface water receptor will be below Surface Water Regs threshold of 2.6 mg/l at 1.68 mg/l, as is the Orthophosphate at 0.13mg/l. The Ammoniacal Nitrogen downgradient concentration will vary dependent on the background concentration. The monitoring shows typical values of 0.02mg/l. When this is the case the concentration, 0.077 mg/l NH4 is well below the Surface Water Regs of 0.14 mg/l.

This level of treatment will ensure that discharges from the WWTP will meet Ground Water and Surface Water Regulations as amended and prevent contamination being released to the water environment.

The proposed foul sewers within the new development will comply with Irish Water Code of Practice for Wastewater Infrastructure.

7.3.1.2 Storm Water Drainage

The stormwater will exit the site via existing drainage network however it will go through a Petrol Interceptor prior to discharge to two interceptors, one located in the south-west corner of the site and the other located adjacent to the main site entrance on the east of the development site (see **Figure 2-7)**. The storm water drainage system takes into consideration the two catchments on the East and West of the site (see topographic map in **Figure 2-5**)

According to the **Civils Report submitted as part of the planning application**, all new surface water drainage within the development will be designed and constructed in accordance with SuDs principles. SuDs is intended to mimic, as far as possible, the natural catchment processes of an undeveloped catchment. This is in line with national and local policy. To improve the sustainability of the development scheme, provision has been made for significant areas of soft landscaping including grass, hedging, planting and trees at the ground level external areas.

In addition to this, the site drainage design for the development has been carried out in accordance with SuDs requirements. It is proposed to use an underground attenuation tank to allow storage of surface water and a flow control device will be fitted on the outlet to limit discharge rates to the greenfield run off rate from the site for the 1 in 30-year storm event.

The roof runoff from the new buildings will be conveyed underground in a sealed storm sewer network and will discharge via soak pits/infiltration trenches into the underlying soil.

Surface water drainage along the circulations roadways and turning areas will use typical kerbside road gullies discharging into a storm sewer network that will in turn discharge into the surrounding subsoil via appropriately designed soak pits with a Petrol Interceptor (full retention) upstream of each soak pit.

All road areas, concreted areas and hardstandings will be constructed with appropriate falls to gullies and channel drains discharging to the surface water system.

Surface water in the car parking areas will discharge into the underlying subsoil via an appropriately designed permeable paving/porous asphalt system.

7.3.2 Local Hydrology

The proposed development site is located within the 'South-Western' River Basin District and Hydrometric Area No. 21, also known as Dunmanus-Bantry-Kenmare Catchment, within the Sub-Catchments 21_1 (COOM_SC_010) and 21_10 (Inny(Kerry)_SC_010). Hydrometric Area No. 20 (Laune-Maine-Dingle Bay) is located to the north of the proposed development site. Refer to **Figure 7-3** for an overview of the sub-catchments' extents.

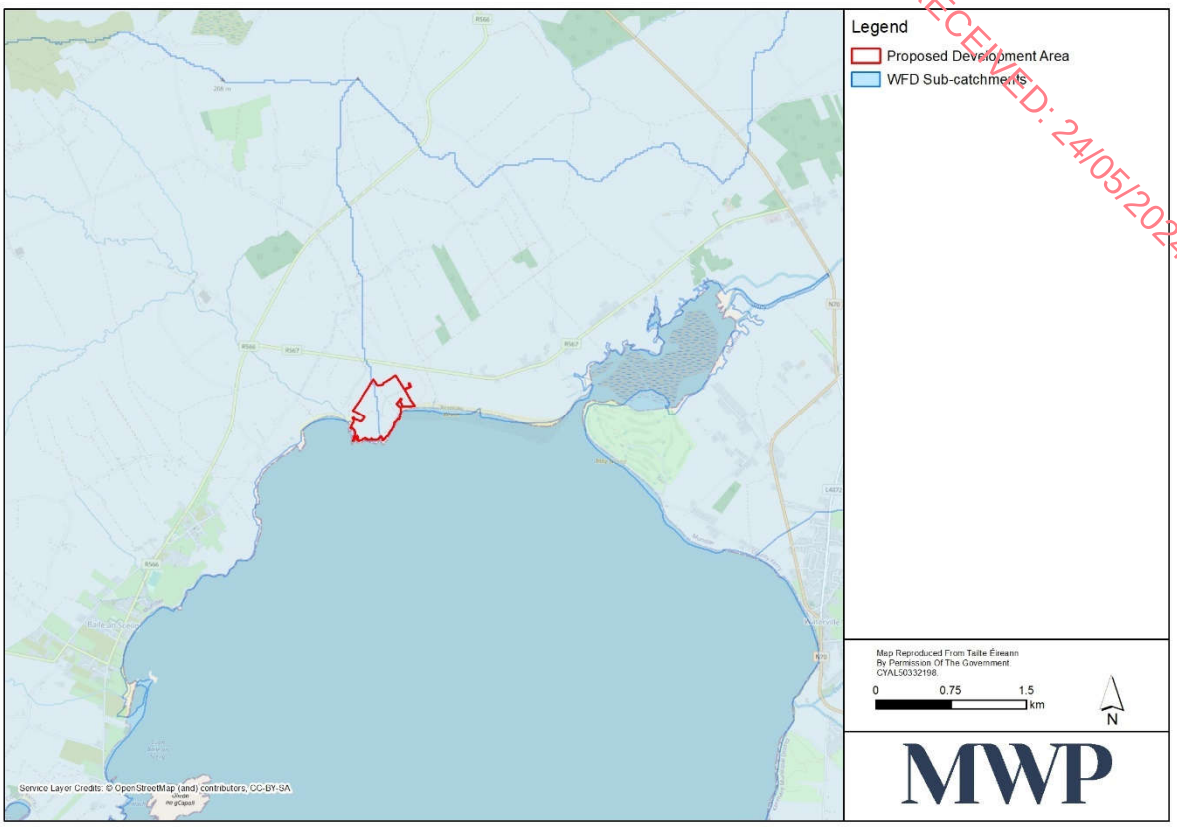

Figure 7-3: Sub-catchment Locations

The river waterbody Emelaghmore 21 (IE_SW_21E010400) is located approximately 50 m to the west of the site boundary. The EPA WFD river water quality status of the Emelaghmore is considered 'Moderate' for the period 2013 - 2018. The WFD Risk Score for this river waterbody is 'at Risk'. This watercourse, which drains peatland, farmland and forestry on lands to the north-west of the proposed development site, discharges to the bay at Trá na Sassanach, approximately 50m west of the proposed development site boundary, at the closest point.

The river waterbody AN_RINN_RUA (IE_SW_21I010900) is located approximately 185 m to the east of the proposed development site boundary. The EPA WFD river water quality status of the An Rinn Rua River is considered 'Moderate' for the period 2013-2018. The WFD Risk Score for this river waterbody is 'at Risk'. This watercourse rises inland further north, also draining peatlands, farmland and forestry, before discharging to the bay at Trá Rinn Rua, approximately 185m east of the Proposed Development site boundary, at the closest point. The river waterbodies in this area flow in a general southerly direction and enter Ballinskelligs Bay west and east of the proposed site boundary.

These river waterbodies drain lands within the proposed development site and are fed by numerous field ditches that criss-cross the site. These ditches are associated with agricultural fields, field boundaries, hedgerows and treelines.

A review of the 'Coom_SC_010 Sub-catchment Assessment WFD Cycle 2' report determined that due to a lack of chemistry data, the significant pressures on the 'Emlaghmore_010' waterbody are not clear; however, it is noted that the proximity of recently afforested areas to the waterbody's monitoring station may indicate a biological impact due to this activity. Diffuse agriculture in certain areas throughout the water body may also be having an

impact, along with peat extraction. These pressures were confirmed by the local authority and the EPA, who noted hydromorphological pressures from badly eroding earthen banks, suspended sediment and cattle poaching[2].

A review of the 'Inny[Kerry]_010 Sub-catchment Assessment WFD Cycle 2' report determined that while the nutrient concentrations of the waterbody are low, areas of blanket bog and certain agricultural sites near the channel may impact the biology of the waterbody. It is also possible that a pollution incident occurred in the upper sub-catchment, impacting the waterbody status and resulting in an elimination of sensitive biological taxa. The most likely drivers are impacts from forestry and clearfelling. There are also hydromorphological impacts from land drainage and reclamation and forestry[3].

As part of the monitoring requirements for compliance with the WFD (Directive 2000/60/EC), the EPA carries out biological monitoring of the Emlaghmore River, at a monitoring station located at Emlaghmore Bridge, approximately 1.2 km upstream of the Trá na Sassanach outfall. The most recent Q-value which has been determined for this river is 'Q3-4 moderate', assigned in 2020[4]. No assigned Q-values are available on the EPA website for the Rinn Rua Stream.

The coastal waterbody Ballinskelligs Bay (IE_SW_200_0000) is located directly west, south and east of the proposed site boundary. The EPA WFD coastal waterbody status of Ballinskelligs Bay is consdered "High" for the period 2013-2018. The WFD Risk Score is "Not at Risk".

Figure 7-4 shows the location of WFD waterbodies in relation to the proposed development site.

[2] https://catchments.ie/wp-content/files/subcatchmentassessments/21_120COOM_SC_01020Subcatchment20Assessment20WFD20Cycle202.pdf Accessed 30/07/2023
[3] https://catchments.ie/wp-content/files/subcatchmentassessments/21_1020Inny[Kerry]_SC_01020Subcatchment20Assessment 20WFD20Cycle202.pdf Accessed 30/07/2023
[4] Available at EPA Maps Accessed 30/07/2023

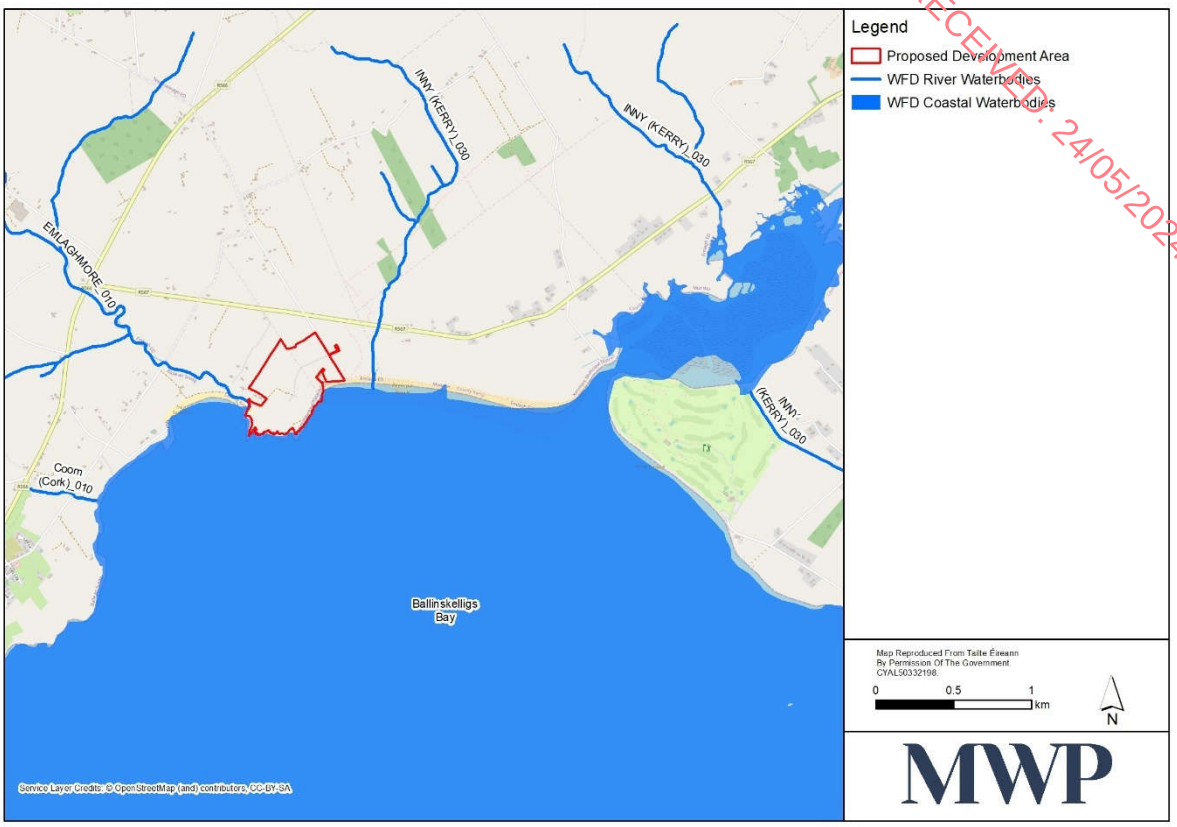

Figure 7-4: Location of waterbodies relative to the proposed development site

Ballinskelligs Bay is designated for one Natura 2000 site, Ballinskelligs Bay and Inny Estuary SAC (Site code: 000335). The river waterbodies entering Ballinskelligs Bay and Inny Estuary near the proposed site are also partly within and hydrologically connected with this SAC.

Refer to **Chapter 05 Biodiversity** and the **AA Screening Report** submitted with the planning application package for further details on this site.

7.3.3 Local Hydrogeology

There are no records of groundwater wells and springs within the site boundary according to the GSI Map Viewer. There are no groundwater monitoring and abstraction wells within the site locality. Refer to **Figure 7-5** below for the location of nearby groundwater wells. There are no recorded karst landforms located on the proposed development site.

The WFD established under the European Communities Directive 2000/60/EC, required 'Good Water Status' for all European water by 2015, to be achieved through a system of river basin management planning and extensive monitoring. 'Good status' means both' Good Ecological Status' and 'Good Chemical Status'.

The Groundwater Body underlying the site is the Beara Sneem Groundwater Body (GWB) (EU code: IE_SW_G_019). Currently, the EPA classifies the Beara Sneem GWB as having WFD Status (2013-2018) of 'Good', with a current WFD risk score of 'Not at Risk'. **Figure 7-6** below presents the most recent data (2021) from the EPA website on groundwater body risk.

There is one bedrock aquifer underlying the site, according to the GSI Map Viewer, a Locally Important Aquifer - Bedrock which is Moderately Productive only in Local Zones (LI).

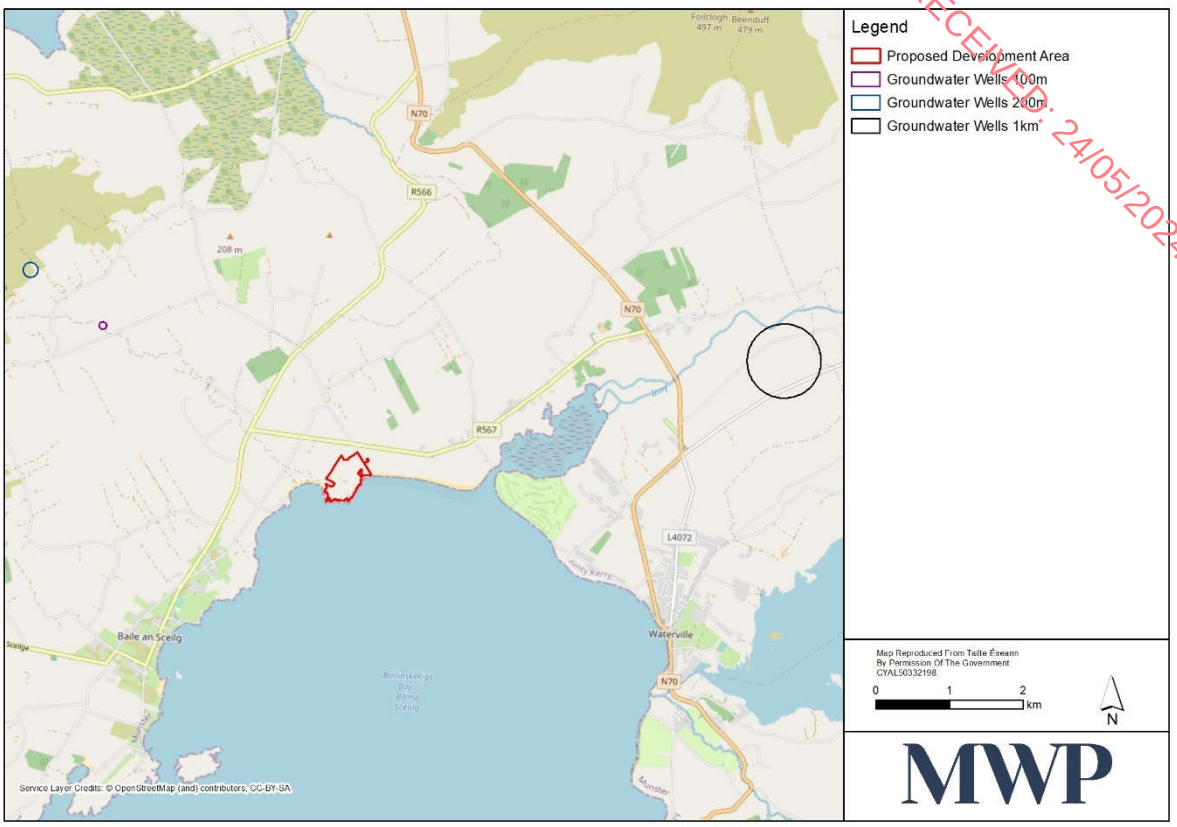

Figure 7-5: Groundwater Wells and Springs (Source: EPA Map Viewer)

There is a Poor Aquifer - Bedrock which is Generally Unproductive except for Local Zones (PI) located approximately 4.3 km north of the site boundary.

Figure 7-7 shows the aquifer extent and location beneath the site and in the greater area.

Groundwater vulnerability is a term used to represent the intrinsic geological and hydrogeological characteristics that determine the ease with which groundwater may be contaminated generally by human activities. Data from the GSI Map Viewer indicates that the majority of the proposed site is underlain by an aquifer of 'high vulnerability'. To the north of the proposed site the groundwater vulnerability is classified as an aquifer of 'moderate vulnerability'. Refer to Figure 7-8 below for groundwater vulnerability mapping beneath the site and within the greater area.

There are no Group Scheme and Public Supply Source Protection Areas or Ground Water Scheme Abstraction Points Located on or adjacent to the proposed development site according to data available on the GSI Map Viewer.

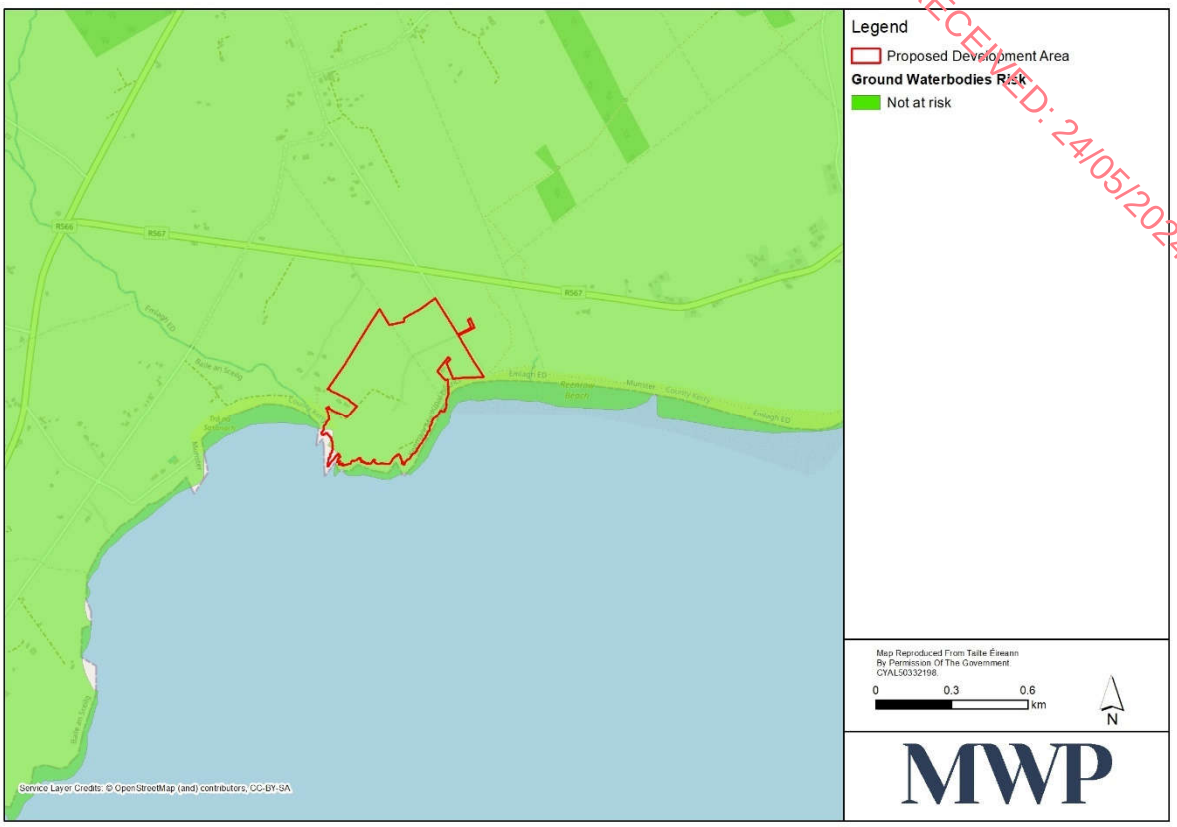

Figure 7-6: EPA Groundwater Body Risk (Source: GSI Map Viewer)

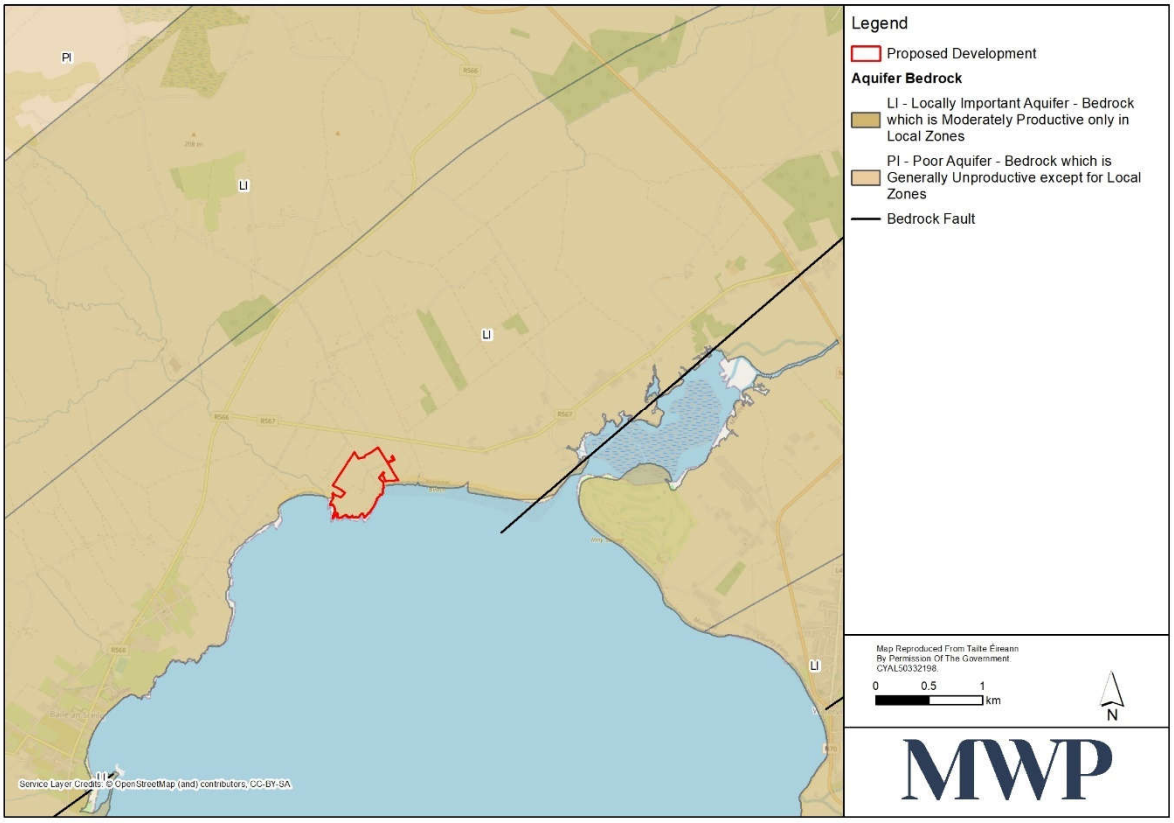

Figure 7-7: Bedrock Aquifer Classification (Source: GSI Map Viewer)

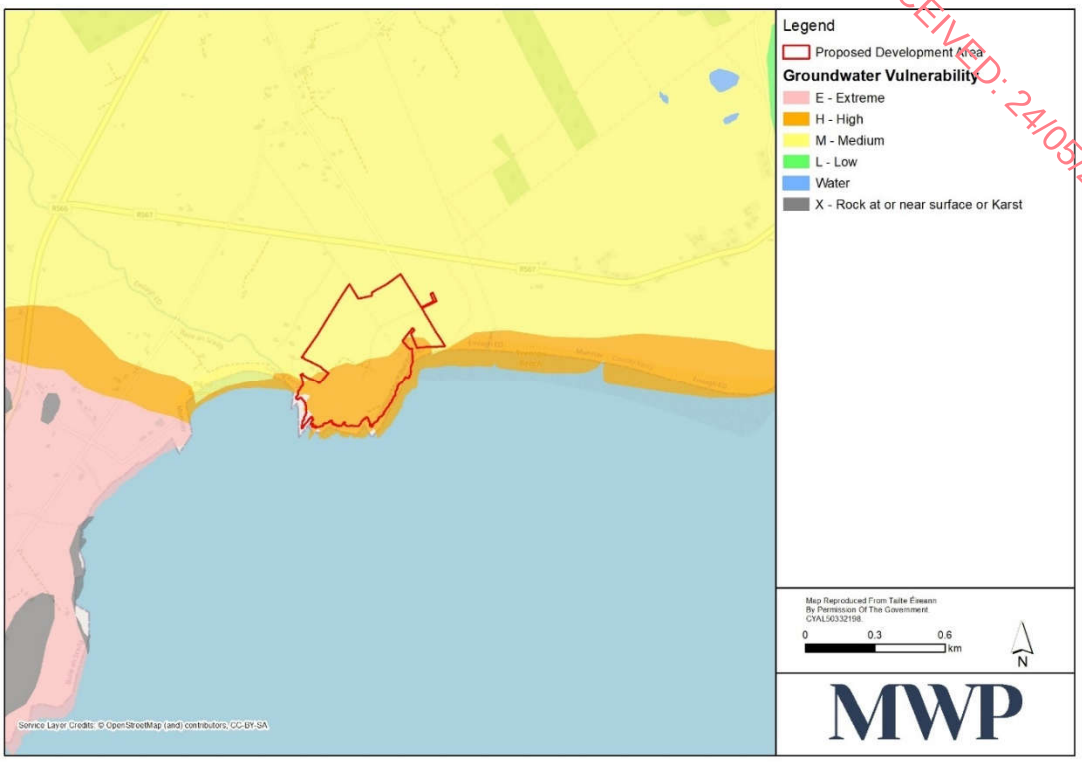

Figure 7-8 Groundwater Vulnerability Classification (Source: GSI Map Viewer)

The subsoil permeability at the proposed development site is recorded as 'Moderate' for the majority of the site with a section of the eastern part of the site recorded as 'High' (Figure 7-9).

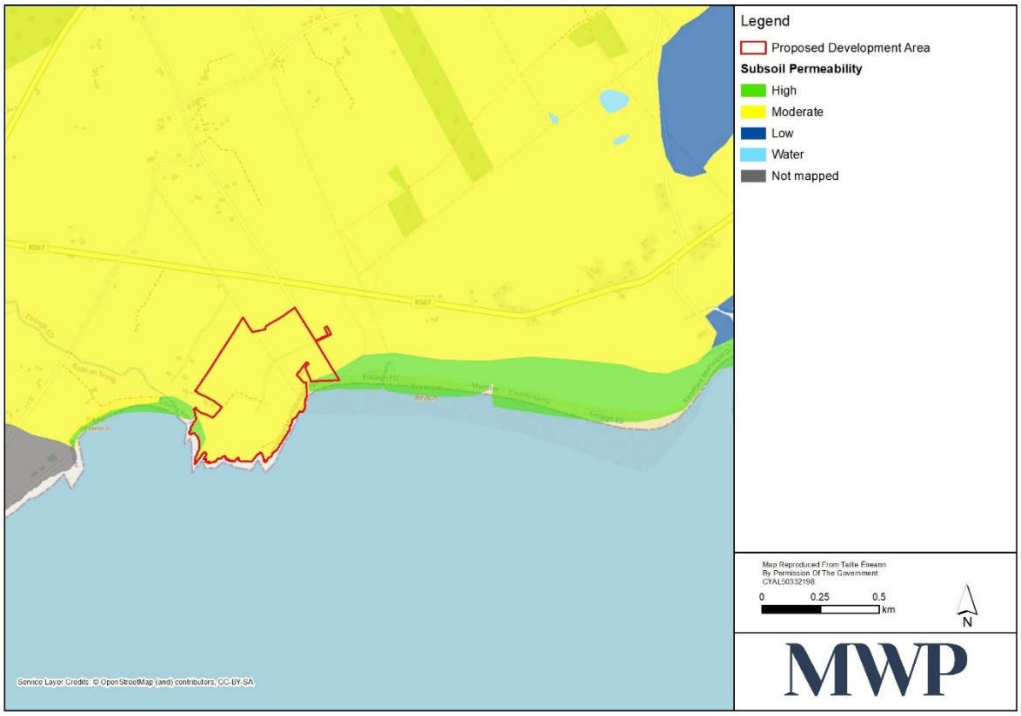

Figure 7-9: Subsoil Permeability (Source: GSI Map Viewer)

7.3.4 Site Specific Hydrology, Hydrogeology and Flood Risk

There are no surface waterbodies located within the site boundary. However, there are river waterbodies directly to the west and east of the proposed site boundary and the coastal waterbody 'Ballinskelligs Bay' directly south of the site. The proposed development is located at a local high point of the headland and all runoff thus flows away from this area as present to the sea and inland to ditches which in turn discharge local streams to the sea. There are no problems of flooding on the proposed development site at present.

7.3.5 Flood Risk Assessment

A Site-Specific Flood Risk Assessment (FRA) Report has been prepared for the proposed development and is included in the Civils Report submitted as part of the planning application.

The purpose of the report is to establish the flood risk associated with the proposed development and, if appropriate, to recommend mitigation measures to prevent any increase in flood risk within the site or externally in the wider area.

The report has been prepared in the context of The Planning System and Flood Risk Management – Guidelines for Planning Authorities, November 2009, published by the Office of Public Works and the Department of Environment, Heritage and Local Government.

The FRA has identified that the site is within Flood Zone C - where the probability of flooding from rivers and the sea is low (less than. 0.1% or 1 in 1000 for both river and coastal flooding) as defined in the Flood Risk Management Guidelines and is appropriate for the development of this hotel and leisure park. The topography ensures that the proposed lowest ground elevation is at 5.1 mOD will be positioned well beyond and above any potential flood levels. The recommended finished floor level is 5.4 mOD.

7.4 Likely Significant Impacts and Effects

This section addresses the potential impacts on the hydrological and hydrogeological environment from activities arising during construction and operation of the proposed development and makes a determination on the likelihood of occurrence. The project has incorporated some elements of mitigation into the construction and operational design of the project. Assessments are therefore based on this being implemented.

The effect tables provided below outline the relevant rating for each of the types of criteria pre and post mitigation. These apply to the different effects described below. The criteria, their explanations and the effect rating methodology outlined in Chapter 01 Introduction of the EIAR have been used to assess the effects.

7.4.1 Construction Phase

7.4.1.1 Construction Effect 1 - Excavations

There is potential for construction sites to cause contamination to the underlying aquifer and to local watercourses due to increased suspended solids and mobilisation of potentially existing contamination within the disturbed soil from excavations. The removal of subsoil across the site can also theoretically increase the vulnerability of the underlying aquifer and impair water quality in watercourses. The majority of the proposed development site is underlain by a bedrock aquifer mapped by the GSI as having a 'High vulnerability'.

The depth of existing overburden and the application of good construction practice will significantly reduce the risk of sediment mobilising and impacting on the underlying groundwater regime. Excavation depths across the

site during construction are not expected to intercept with the water table. However, there remains some potential for groundwater levels to be affected due to excavations, however these levels will rebound to normal levels following completion of the works.

There are no existing watercourses on the site. The nearest watercourses to the site are the river waterbody Emelaghmore 21 (IE_SW_21E010400) which is located approximately 50 m to the west of the site boundary and the river waterbody AN_RINN_RUA (IE_SW_21I010900) which is located approximately 185 m to the east of the site boundary.

Considering that there are two existing watercourses adjacent to the proposed development site and a possible hydrological connection between the site and the water courses via drainage ditches there is potential for excavation works to cause negative effects during the construction phase. The implementation of good practice and a Surface Water Management Plan during construction will reduce the risk of contamination to watercourses. It is possible that water levels in adjacent watercourses may be affected during construction. These levels will rebound to existing levels following completion of the works.

It is considered that without the implementation of mitigation measures, excavation works during construction of the proposed development have the potential to cause noticeable localised changes in the groundwater regime if groundwater is encountered, but without significant consequences. This would occur over a short-term period. Refer to **Table 7-1** below.

It is considered that without the implementation of mitigation measures, excavation works during construction of the proposed development have the potential to cause noticeable localised changes in the hydrological regime if affected, but without significant consequences. This would occur over a short-term period. Refer to **Table 7-2** below.

Table 7-2: Construction Effect 1: Excavations on Hydrogeology

	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Pre - Mitigation	Negative	Not significant	Localised	Short-term	Indirect Irreversible	Likely

Table 7-3: Construction Effect 1: Excavations on Hydrology

	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Pre - Mitigation	Negative	Not significant	Localised	Short-term	Indirect Irreversible	Likely

Without mitigation, it is considered likely that there will be a **negative not significant short-term effect** on hydrogeology and a **negative not significant short-term effect** on hydrology as a result of excavations during construction.

7.4.1.2 Construction Effect 2 - Accidental spillage

The potential spillage of hydrocarbons from fuel and oils used during construction have the potential to contaminate the underlying ground water regime on the site. Groundwater may be affected through percolation of contaminants. However, good construction practice and the implementation of all measures outlined in the **Construction Environmental Management Plan (CEMP) (Appendix 2-1)**, including the Surface Water Management Plan outlined in EMP 2 will effectively reduce the potential for impacts on groundwater quality on the site. Effects are therefore considered unlikely to occur.

Considering that there are two existing watercourses adjacent to the proposed development site, the coastal waterbody adjacent to the proposed development site and a possible hydrological connection between the site and the water courses via drainage ditches and via overland flow there is potential for accidental spillages to cause negative effects during the construction phase. The implementation of good practice and a Surface Water Management Plan during construction will reduce the risk of contamination to watercourses.

It is considered that without the implementation of mitigation measures, accidental spillage during construction has the potential to cause noticeable changes in the groundwater regime if groundwater is encountered, but without affecting its sensitivities. This would occur over a short-term period. Refer to **Table 7-4** below.

It is considered that without the implementation of mitigation measures, accidental spillage during construction of the proposed development has the potential to cause noticeable changes in the hydrological regime if affected, but without significant consequences. Refer to **Table 7-5** below.

Table 7-4: Construction Effect 2: Fuels and oil spillage on Hydrogeology

	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Pre - Mitigation	Negative	Slight	Localised	Short-term	Indirect Irreversible	Unlikely

Table 7-5: Construction Effect 2: Fuels and oil spillage on Hydrology

	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Pre - Mitigation	Negative	Not significant	Localised	Short-term	Indirect Irreversible	Unlikely

Without mitigation, it is considered unlikely that there will be a negative slight short-term effect on hydrogeology and a negative not significant short-term effect on hydrology as a result of fuel and oil spillages during construction.

7.4.2 Operational Phase

Any uncontrolled and/or contaminated discharge to a surface water body has the potential to have an negative impact ranging in significance and duration on the receiving environment depending on the characteristics of such a discharge. The potential effects associated with the operational phase of the proposed development on the hydrological and hydrogeological environment are described in the following sections.

7.4.2.1 Operational Effect 1 – Wastewater Discharge

The daily demand for water by the proposed development will vary depending on occupancy. The expected maximum water usage is approx. 144 400 litres per day. This will be sourced from the existing Irish Water mains water supply to the development site and will lead to an equivalent volume of wastewater discharge requiring treatment.

The assessment of Surface Water Assimilative Capacity (see **Section 3.4.2** of the **Civils Report**) indicates that the predicted BOD at the surface water receptor will be below Surface Water Regulation standard of 2.6 mg/l at 1.68 mg/l, as is the Orthophosphate at 0.13mg/l. The Ammoniacal Nitrogen downgradient concentration will vary dependent on the background concentration. The monitoring shows typical values of 0.02mg/l. In this case the concentration of 0.077 mg/l NH_4 will be well below the Surface Water Regulation standard of 0.14 mg/l.

In the event of a WWTP system failure there is no risk of untreated wastewater overflowing or being discharged to the percolation areas. The most likely cause of a failure would be associated with a loss of power. Treated water cannot be discharged to the percolation areas without an operational pump. The WWTP and associated infrastructure will include additional storage capacity and a back-up power supply for the pumps. The system will be continually monitored by a trained operator and will include in-built alarms and shut down mechanisms to identify, prevent and manage any problems. A licenced operator will also be contracted by the developer to monitor, supervise and maintain the treatment system.

Consequently, there is no potential for any negative effects on hydrogeology and hydrology that are capable of measurement with significant consequence over a long-term period of 15 – 60 years. Refer to **Table 7-6** below.

Table 7-6: Operational Effect 1: Foul Discharge on Hydrogeology and Hydrology

	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Pre - Mitigation	Neutral	Imperceptible	Localised	Long-term	Indirect irreversible	Unlikely

Mitigation measures for Wastewater Drainage during the Operational Phase are presented in **Section 7.5.1**.

7.4.2.2 Operational Effect 2 – Storm Water Discharge

The operational phase of the development will represent a permanent change to the existing environment.

Roof runoff from the new buildings will be conveyed underground in a sealed storm sewer network and will discharge via soak pits/infiltration trenches into the underlying subsoil. Where feasible, rainwater harvesting from surface areas and buildings will be deployed and used for water requirements for landscaping.

Surface water drainage along the circulation roadways and turning areas will use kerbside road gullies (as indicated on **Drawing 23063-MWP-ZZ-ST-DR-C-5403** submitted as part of the planning application) discharging into a storm sewer network that will in turn discharge into the surrounding subsoil via appropriately designed soak pits with a full retention petrol interceptor upstream of each soak pit.

All road areas, concreted areas and other hard paved areas (hardstandings) will be constructed with appropriate falls to gullies and channel drains discharging to the surface water system. Surface water in the car parking areas will discharge into the underlying subsoil via an appropriately designed permeable paving/porous asphalt system.

There will be a significant increase in the surface area of impermeable surfaces across the site which has the potential to reduce drainage and increase surface water run off rates. Surface water will be managed using SuDS features, as explained in **Section 7.3.1.2** above. This aims to provide an effective drainage system to mitigate the negative effects of urban storm water runoff on the environment by reducing runoff rates, volumes and frequency. The SuDS features aim to replicate the natural characteristics of rainfall runoff.

The surface water drainage network is designed with a “mitigation by design” mentality, and therefore no further mitigation measures are required.

The quality of the local hydrological and hydrogeological environment can potentially become compromised as a result of poorly designed surface management systems in operational developments. As described above in **Section 7.3.1.2**, the surface water drainage network will be designed so as to ensure surface water flow is controlled during the operational phase of the proposed development, and therefore minimising the potential for effects on hydrology or hydrogeology. Surface water from all paved areas will enter gullies across the site.

It is considered that the discharge of storm water during operation of the proposed development has the potential to cause noticeable changes in the hydrological and hydrogeological regime, but without significant consequences. This would occur over a long-term. Refer to **Table 7-7** below.

Table 7-7: Operational Effect 2: Storm Water Drainage Effects on Hydrogeology and Hydrology

	Quality of Effect	Significance	Spatial Extent	Duration	Other Relevant Criteria	Likelihood
Pre - Mitigation	Neutral	Not significant	Localised	Long-term	Indirect irreversible	Unlikely

It is considered that the effect of storm water drainage on hydrogeology and hydrology during the operation phase of the proposed development will be **neutral, not significant, localised and long-term**. No mitigation measures are proposed.

7.4.3 Do-Nothing Scenario

In the event of a do-nothing scenario the existing hydrology and hydrogeology of the site will remain unaffected.

7.4.4 Cumulative Impacts and Effects

Cumulative effects relate to the addition of many minor or insignificant effects, including effects of other projects, to create larger, more significant effects.

The existing and planned developments around the proposed development are described in **Table 1-4** of **Chapter 01 Introduction** of the **EIAR**.

Eleven planning applications (see **Table 1-**4 in **Chapter 01 Introduction**) were identified. All are related to tourism activities. Six of these were in the pre-covid period and are likely to be completed and will therefore have no cumulative effect on water resources with the proposed development. One of these (No. 1 - the Hogs Head Hotel complex in 2017) included the provision of new tourism accommodation. This facility is an operational luxury hotel located within a golf estate on the east side of Waterville town on the banks of Lough Currane. Two more recent planning applications (see number 7 and 9 in **Table 1-4**) include the development of six self-catering accommodation units (No. 7) and five glamping pods(No.9). One (see No.8) provides a viewing area, path and car park in Ballinskelligs. The two most recent applications involve upgrades and additions to existing tourism businesses that do not include the provision of new tourist accommodation. The decision on two of these applications is still pending and requires further information. The majority of projects identified were predominantly retentions, with other applications including alterations or conversions to single unit dwellings and were considered to be localised in scale and extremely unlikely to have in combination effects with the proposed development worksAll the existing approved planning applications are/will be subject to appropriate planning and regulatory consents, to ensure that there are no significant effects on the water environment.

An **AA Screening Report** was completed for the proposed development and concluded following examination of the relevant information, that the proposed development will not adversely affect, either directly or indirectly, the integrity of any European site, either alone or in combination with other plans or project. Additionally, mitigation measures will be implemented as part of this EIAR and the CEMP to ensure that there will be no significant negative effects on the water regime pertaining to the development site. Having considered the implementation of good construction practice and design for the proposed development and other development in the surrounding area and given that there will be no significant negative effect on water associated with the proposed development no cumulative effects are anticipated during the construction or operational phases.

7.5 Mitigation and Monitoring Measures

Proposed mitigation measures for the development are outlined in the following sections and the associated residual effects are described in Section 7.7.

The project will be developed in accordance with the control measures outlined below. The following guidance documents were referenced in developing mitigation measures specific to water:

- CIRIA 32 (2001) Control of Water Pollution from Construction Sites–Guidance for consultants and contractors.

The control measures and monitoring requirements listed in this section will be implemented throughout the project by the appointed contractor.

The mitigation and control measures are outlined in the CEMP (Appendix 2-1). The appointed contractor will be responsible for developing the final CEMP and implementing the control measures set out in the CEMP.

7.5.1 Operation and Maintenance Plan for Wastewater Treatment Plant

An Operation and Maintenance Plan will be prepared and implemented by an appointed WWTP operator to ensure the WWTP is operated and maintained according to the manufacturer's instructions. Regular inspections will be carried out on the WWTP by competent personnel. This will be carried out in accordance with best practice measurer for operation and maintenance of WWTPs.

Compliance monitoring may also need to be carried out to check compliance with terms of any authorisations that the WWTP requires such as a Discharge to Groundwater License which may be required in accordance with the Groundwater Regulations (S.I. No. 9 of 2010) and other legislation. Any compliance monitoring will be completed in accordance with specified requirements by the WWTP operator.

7.5.2 Emergency WWTP Action Plan

The WWTP and associated infrastructure will include additional storage capacity and a back-up power supply for the pumps. The system will also be continually monitored by a trained operator and will include in-built alarms and shut down mechanisms to identify, prevent and manage any problems. A licenced operator will also be contracted by the developer to monitor, supervise and maintain the treatment system.

An Emergency Action Plan will be prepared and implemented by the WWTP operator prior to commissioning of the proposed development. In the unlikely event of a breakdown that requires the removal of untreated sewage, an approved Waste Removal Tanker company will be engaged and will be available on-call to collect and remove any untreated effluent to a licenced waste facility.

7.5.3 Drainage and Sediment Control

Control measures to be implemented include:

- Fuels, oils, greases, and hydraulic fluids will be stored in bunded compounds. Refueling of machinery, etc. must be carried out in bunded areas. Fuels will be stored during the construction phase in bunded fuel storage tanks with a 110% holding capacity. Where it is necessary to dispense fuels on site, this will be undertaken in areas covered with an impermeable surface to protect ground water;

- Construction works, especially ones involving the pouring of concrete, will be conducted in the dry where possible;
- To help prevent the contamination of the ground and groundwater, contaminated materials (oils, fuels, chemicals etc.) will be stored in 110% capacity bunded compounds as outlined in the relevant guidance, i.e. CIRIA (2001) and DMRB Volume 11 (1994).

7.5.4 Temporary Construction Compound

- Temporary toilet facilities will be managed by the Contractor during the construction phase;
- A bunded containment area will be provided within the compound for the storage of fuels, lubricants, oils etc.; and
- The compound will be in place for the duration of the construction phase and will be removed once commissioning is complete.

7.5.5 Storage and Stockpiles

- Temporary stockpiles of excavated earth will be constructed within the lands during construction;
- All excavated materials from the site or introduced materials for construction will be either used or removed from the site;
- No permanent spoil or stockpiles will be left on site, other than those materials required for landscaping, berm construction and construction generally;
- Temporary storage areas for fuels and other hazardous materials required by the contractor during construction will be stored in appropriately bunded facilities to prevent the accidental spillage of hazardous liquids that could cause soil and groundwater contamination;
- Collision with oil stores will be prevented by locating oils within a steel container in a designated area of the site compound away from vehicle movements;
- Long term storage of waste oils will not be allowed on site. These waste oils will be collected in leak-proof containers and removed from the site for disposal or re-cycling by an approved service provider, as required; and
- On-site washing of concrete truck barrels should not be allowed. The washing of the chutes at the rear of the trucks may be permitted. A designated wash area will be required.

7.6 Risk of Major Accidents and Disasters

This section presents an assessment of the vulnerability of the proposed development in relation to major accidents and disasters. It assesses the likelihood of the proposed development to cause an increased risk of major accidents and disasters.

Major accidents can relate to any incident, technological or otherwise, which has the potential to have a significant impact on the facility or on the receiving environment. Examples of major accidents which have such potential are fire, explosion, traffic collisions, contamination and pollution.

The Control of Major Accident Hazards Involving Dangerous Substances Regulations 2015 (S.I. No. 209 of 2015) (the "COMAH Regulations") place an obligation on operators of establishments that store, handle or process

dangerous substances above certain thresholds to take all necessary measures to prevent major accidents and to limit the consequences for human health and the environment. The proposed development is not subject to the requirements of the COMAH Regulations.

A natural disaster is an all-encompassing term which describes any severe natural event which has the potential to cause disturbance to an individual, development or population. The severity depends on the receptor and the type of disaster. Examples of natural disasters are earthquakes, flooding, tsunamis, lightning strikes, hurricanes or any other extreme natural event. This section has considered the potential increased risk of such events occurring as a result of climate change, such as sea-level rise and increased frequency in the occurrence of extreme weather events.

The principle risk associated with the proposed development relates to increased flood risk due to the increase in impermeable hard standing across the site. As discussed previously in Section 7.3.5, a site-specific FRA was undertaken. The FRA has identified that the site is within Flood Zone C as defined in the Flood Risk Management Guidelines and is appropriate for the proposed development.

It is considered that there is no potential for the proposed development to cause a major accident or disaster. Furthermore, there is no increased risk to the development from a major accident or disaster.

7.7 Residual Effects

The post mitigation residual effects associated with the construction and operation phases of the proposed development are outlined in Table 7-8, below. No significant negative negative effects will occur as a result of the proposed development.

Table 7-8: Effects on hydrology and hydrogeology pre and post mitigation

RECEPTOR	EFFECT (PRE-MITIGATION)	MITIGATION MEASURES	RESIDUAL EFFECT (POST-MITIGATION)					
			QUALITY OF EFFECT	SIGNIFICANCE	SPATIAL EXTENT	DURATION	OTHER RELEVANT CRITERIA	LIKELIHOOD
CONSTRUCTION								
Excavations (Hydrology)	Unlikely neutral not significant short-term	Refer to Section 7.5	Neutral	Imperceptible	Localised	Short- term	Indirect Irreversible	Unlikely
Excavations (Hydrogeology)	Unlikely neutral not significant short-term		Neutral	Imperceptible	Localised	Short- term	Indirect Irreversible	Unlikely
Accidental Spillage (Hydrology)	Unlikely neutral not significant short-term		Neutral	Imperceptible	Localised	Short- term	Indirect Irreversible	Unlikely
Accidental Spillage (Hydrogeology)	Unlikely negative slight short-term		Negative	Not significant	Localised	Short- term	Indirect Irreversible	Negative
OPERATIONAL								
Wastewater Discharge	Unlikely negative, significant, long-term	Refer to Section 7.5	Neutral	Imperceptible	Localised	Long-term	Indirect Irreversible	Unlikely
Storm Water	Unlikely negative not significant long-term	No	N/A	N/A	N/A	N/A	N/A	N/A